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Date:

March 21, 2007
Jenny Aiel

Attorney Docket No. 100717-688 KGB
Confirmation No.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT : Alexander AZZAWI et al ✓
SERIAL NO. : 10/583,524
CUSTOMER NO. : 27384
FILED : June 16, 2006
FOR : METHOD AND DEVICE FOR MARKING
BIOMOLECULES
ART UNIT : To Be Assigned
EXAMINER : To Be Assigned

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

**TRANSMITTAL OF ENGLISH TRANSLATION OF THE
INTERNATIONAL SEARCH REPORT**

SIR:

Appended hereto is an English translation of the International Search Report.

Applicant requests that this document be made of record in the above identified application.

Respectfully submitted,
NORRIS MC LAUGHLIN & MARCUS, P.A.

By

Kurt G. Briscoe
Attorney for Applicant(s)
Reg. No. 33,141
875 Third Avenue - 18th Floor
New York, New York 10022
Phone: (212) 808-0700
Fax: (212) 808-0844

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NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rules 44bis.3(c) and 72.2)

From the INTERNATIONAL BUREAU

AUSL.-Gr.

To:

Dr. Lüfgens

SIEGERS, Britta
c/o Bayer Business Services GmbH
Law and Patents
Patents and Licensing
51368 Leverkusen
ALLEMAGNE

Bayer AG
Bayer Business Services
Law and Patents

14. Sep. 2006

EINGANG

Date of mailing (day/month/year)
08 September 2006 (08.09.2006)

Applicant's or agent's file reference
EMB 04 1018-WO

IMPORTANT NOTIFICATION

International application No.
PCT/EP2004/012172

International filing date (day/month/year)
28 October 2004 (28.10.2004)

Applicant

EHRFELD MIKROTECHNIK BTS GMBH et al

1. Transmittal of the translation to the applicant.

The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).

The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Yolaine Cussac

Facsimile No. +41 22 338 82 70

Facsimile No. +41 22 338 82 70



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference B 04 1018-WO	FOR FURTHER ACTION		See item 4 below
International application No. PCT/EP2004/012172	International filing date (<i>day/month/year</i>) 28 October 2004 (28.10.2004)	Priority date (<i>day/month/year</i>) 20 December 2003 (20.12.2003)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant RFELD MIKROTECHNIK BTS GMBH			

This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

This REPORT consists of a total of 9 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input checked="" type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

Date of issuance of this report 29 August 2006 (29.08.2006)	
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Yolaine Cussac e-mail: pt11@wipo.int
Facsimile No. +41 22 338 82 70	

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT
TRANSLATION

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

(PCT Rule 43bis.1)

Date of mailing (day/month/year)		See form PCT/ISA/210
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FOR FURTHER ACTION See paragraph 2 below	
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Applicant's or agent's file reference
EMB 04 1018-WO

International application No.
PCT/EP2004/012172

International filing date (day/month/year)
28.10.2004

Priority date (day/month/year)
20.12.2003

International Patent Classification (IPC) or both national classification and IPC
G01N33/533, B01J19/00, B01F13/00

Applicant

EHRFELD MIKROTECHNIK BTS GMBH

1. This opinion contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the opinion
<input type="checkbox"/>	Box No. II	Priority
<input checked="" type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/EP2004/012172

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
 a sequence listing
 table(s) related to the sequence listing
 - b. format of material
 in written format
 in computer readable form
 - c. time of filing/furnishing
 contained in the international application as filed.
 filed together with the international application in computer readable form.
 furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/EP2004/012172

Box No. III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

the entire international application

claims Nos. 8

because:

the said international application, or the said claims Nos. _____ relate to the following subject matter which does not require an international preliminary examination (specify):

the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _____ are so unclear that no meaningful opinion could be formed (specify):

the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed.

no international search report has been established for said claims Nos. 8

the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

has not been furnished
 does not comply with the standard

the computer readable form

has not been furnished
 does not comply with the standard

the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

See Supplemental Box for further details.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.	PCT/EP2004/012172
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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement

Novelty (N)	Claims —	YES
	Claims 1-7	NO
Inventive step (IS)	Claims —	YES
	Claims 1-7	NO
Industrial applicability (IA)	Claims 1-7	YES
	Claims —	NO

2. Citations and explanations:

Reference is made to the following documents:

D1: SPIKMAN VALERIE ET AL: "On-line on-chip post-column derivatisation reactions for pre-ionisation of analytes and cluster analysis in gradient microliquid chromatography/electrospray mass spectrometry." RAPID COMMUNICATIONS IN MASS SPECTROMETRY: RCM. 2002, vol. 16, no. 14, 2002, pages 1377-1388, XP009049801 ISSN: 0951-4198

D2: WO 96/40398 A (BIOSEPRA INC) 19 December 1996 (1996-12-19)

D3: KLING KERSTIN ET AL: "Visualization of micro- and macromixing in liquid mixtures of reacting components". PROC. ASME/JSME JOINT FLUIDS ENG. CONF.; PROCEEDINGS OF THE ASME/JSME JOINT FLUIDS ENGINEERING CONFERENCE 2003, vol. 2 C, 2003, pages 2329-2335, XP009049802

D4: BRINKLEY M: "A BRIEF SURVEY OF METHODS FOR PREPARING PROTEIN CONJUGATES WITH DYES, HAPTENS, AND CROSS-LINKING REAGENTS"

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/EP2004/012172

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

BIOCONJUGATE CHEMISTRY, AMERICAN CHEMICAL
SOCIETY, WASHINGTON, US, vol. 3, no. 1,
January 1992 (1992-01), pages 2-13,
XP000261480 ISSN: 1043-1802

D5: HAUGLAND R P: "COUPLING OF MONOCLONAL
ANTIBODIES WITH FLUOROPHORES" METHODS IN
MOLECULAR BIOLOGY, HUMANA PRESS INC.,
CLIFTON, NJ, US, vol. 45, 1995, pages 205-
221, XP009020645

1. Clarity (PCT Article 6)

The phrases "biomolecules" and "marker compound" in claim 1 are vague and unclear and leave the reader uncertain as to the meaning of the technical features in question. As a result, the subject matter of said claim is not clearly defined (PCT Article 6).

2. Novelty (PCT Article 33(1) and 33(2))

The present application does also not meet the requirements of PCT Article 33(1) because the subject matter of claims 1-7 is not novel under PCT Article 33(2).

2.1 Document D1 discloses (the references between parentheses relate to this document) a method for labeling biomolecules carrying free reactive groups (aldehydes and amines may be regarded as such, see also figure 1) by a marker compound

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2004/012172

Box No. V

Reasoned statement under Rule 43bis.I(a)(i) with regard to novelty, inventive step or industrial applicability:
citations and explanations supporting such statement

reacting therewith with formation of a covalent bond (see figures 4 and 5, TMPP+ is regarded here to be the "marker compound"), characterized in that solutions of both compounds are delivered in defined mass flows to a micromixer, preferably a static micromixer, the reaction mixture, where appropriate, is subsequently fed into a dwell structure and remains there for a time predetermined by the volume of said dwell structure and the flow rate of the reaction mixture, and the reaction is stopped after a time preset by the reaction conditions (see page 1378, left column, last paragraph - page 1378, right column, second paragraph, page 1379, and page 1381, right column - 1382, left column, second paragraph). With regard to D2, dependent claims 2, 4-7 do not appear to contain any additional features which, in combination with the features of any claim to which claims 2, 4-7 refer back, meet the EPC requirements for novelty and inventive step. Claim 3 is novel with regard to D1.

2.2 Document D2 likewise discloses a method according to claim 1. D2 discloses on-line detection of a biomolecule (protein, nucleic acid, etc., see claim 9, for example) by reaction with a fluorescent dye (page 14, line 29 - page 14, line 7), with use of a micromixer (see figure 1: systems 13, 33 and 31, and pages 13 and 14) and formation of a covalent bond (page 15, lines 20-25). With regard to D2, dependent claims 2-7 do

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/EP2004/012172

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

not appear to contain any additional features which, in combination with the features of any claim to which claims 2-7 refer back, meet the EPC requirements for novelty and inventive step.

3. Document D3 discloses visualization of reactions in liquid mixtures which are mixed by a micromixer. Here, 2 markers are added, one of which undergoes a chemical reaction, while the second one is inert. The reacting marker is a starch iodine complex which is decolorized by sodium thiosulfate in the course of reaction visualization. Thus, the reacting marker does not form a covalent bond with the biomolecule, starch. D3 is therefore not prejudicial to the novelty of claim 1.

Documents D4 and D5 disclose the reactions carried out in the examples. Said reactions are not carried out using a micromixer, however. They are therefore not prejudicial to the novelty of present claims 1-7. The examples demonstrated the advantages of the claimed method (degree of labeling) over the "traditional" labeling methods in D4 and D5.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/EP2004/012172

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box III

Claim 8 relates to an inordinately large number of possible devices. The subject matter of claim 8 does not contain any technical equipment features which would characterize the claimed device more precisely. The device according to claim 8 therefore appears unclear and too broadly worded (PCT Article 6) to the extent that it is impossible to conduct a meaningful search. Any micromixer essentially is within the scope of protection of claim 1.

Consequently, no expert opinion has been established for claim 8 in respect of novelty, inventive step and industrial applicability (PCT Rule 66.1(e)).

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